TABLE 1.—*Mean free-air temperatures and relative humidities obtained by airplanes during year 1936*—Continued

TEMPERATURE (°C.)

Stations	Altitude (meters) m. s. l.																Number of observations
	Surface		500		1,000		1,500		2,000		2,500		3,000		4,000		5,000		
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	
San Diego, Calif.[3] (10 m)	14.8	−1.3	15.2	+0.1	16.1	+0.5	14.9	+0.6	12.3	−0.1	9.6	−0.2	6.6	−0.4	0.6	−0.2	−6.0	−0.2	357
Scott Field (Belleville), Ill.[1] (135 m)	7.9		11.1		10.9		9.2		6.8		4.2		1.6		−4.4		−10.7		291
Seattle, Wash.[3] (10 m)	9.7	−1.3	7.6	−1.5	6.0	−1.2	3.7	−1.2	1.4	−1.0	−1.1	−1.0	−3.5	−0.9	−9.6	−1.4	−16.8	−2.2	99
Selfridge Field (Mount Clemens), Mich.[1] (177 m)																			
Spokane, Wash.[2] (596 m)	5.4				8.6		7.9		5.5		2.5		−0.6		−7.0		−13.7		362
Sunnyvale, Calif.[3] (10 m)																			
Washington, D. C.[3] (13 m)	9.6	−1.9	10.5	−0.3	8.6	−0.4	6.6	−0.4	4.6	−0.4	2.4	−0.4	0.0	−0.6	−5.2	−0.7	−10.6	−0.5	
Wright Field (Dayton), Ohio[1] (244 m)	7.4		9.2		8.5		6.9		4.8		2.4		−0.2		−5.7		−12.0		307

RELATIVE HUMIDITY (PERCENT)

Barksdale Field (Shreveport), La.	80		63		59		56		52		47		45		43		39		
Billings, Mont.	58						50		49		52		55		57		56		
Boston, Mass.																			
Cheyenne, Wyo.	66								61		53		52		53		54		
El Paso, Tex.	51						47		47		48		48		49		46		
Fargo, N. Dak.	75		65		60		56		53		51		51		50		50		
Kelly Field (San Antonio), Tex.	87		76		68		62		56		51		47		44		42		
Lakehurst, N. J.	79		66		62		59		57		54		50		46		42		
Maxwell Field (Montgomery), Ala.	78		62		58		57		50		46		42		38		34		
Mitchel Field (Hempstead, L. I.), N. Y.	82		73		69		67		63		58		54		51		49		
Murfreesboro, Tenn.	82		69		65		62		59		54		51		46		42		
Norfolk, Va.	80	+5	65	−1	61	−1	59	0	56	0	52	−1	49	0	47	+3	45	+5	
Oklahoma City, Okla.	69		65		56		53		50		48		47		46		43		
Omaha, Nebr.	74	−5	66	−6	58	−2	54	−1	52	0	52	+1	51	0	50	+1	50	+3	
Pearl Harbor, Territory of Hawaii																			
Pensacola, Fla.	86	+4	74	0	69	0	64	0	58	−1	53	−2	49	−2	43	−2	38	−3	
San Diego, Calif.	84	+9	76	+5	56	+3	44	+1	40	+4	37	+4	36	+5	35	+6	34	+7	
Scott Field (Belleville), Ill.	79		61		54		52		52		50		48		45		43		
Seattle, Wash.	79	+2	76	+2	71	+1	69	+3	65	+3	61	+4	57	+5	54	+6	52	+5	
Selfridge Field (Mount Clemens), Mich.																			
Spokane, Wash.	76				64		58		58		58		58		56		53		
Sunnyvale, Calif.																			
Washington, D. C.	79	+6	58	−6	57	−4	56	−3	55	−2	51	−3	48	−2	44	−2	41	−1	
Wright Field (Dayton), Ohio	81		71		65		60		58		56		53		50		49		

Observations taken about 4:00 a. m., 75th Meridian time except along the Pacific coast and Hawaii where they are taken at dawn.

[1] Army. [2] Weather Bureau. [3] Navy.

NOTE.—The departures are based on normals covering the following total number of observations made during the same month in previous years, including the current month: The departures are based on normals covering the following total number of observations made during previous years, including the current year. The figures in parentheses indicate the number of years of record. (When the number of years of record varies for the different months of the year, the various numbers pertinent thereto are all given): Norfolk, 1701 (6, 7, 8); Omaha, 1907 (5, 6); Pensacola, 2212 (8, 9); San Diego, 2201 (8); Seattle, 693 (4, 6, 7).

RIVERS AND FLOODS

[River and Flood Division, W. J. MOXOM, temporarily in charge]

By BENNETT SWENSON

There was abundant precipitation during the month of December. The amounts were near normal to considerably above normal, rather generally, east of the Great Plains and also over a large area of the far Southwest; falls were scanty over most of the Northwest and the Rio Grande Valley.

Over the Atlantic slope drainage, where the precipitation was generally quite heavy, the rivers from southern Virginia to Florida were near or above flood stage at some time or other during the month. The most severe flooding occurred in the Neuse and Cape Fear Rivers in North Carolina and in the Santee and Savannah Rivers in South Carolina and Georgia. These rivers were in flood a good part of the month, however, no appreciable amount of damage was incurred.

Some flooding occurred in the Sulphur River in Texas during the first half of the month and again at the close.

The lower Ohio River and tributaries began to rise during the closing days of the month from the gradual accumulation of precipitation. The Wabash River system reached flood stage in the West Fork of the White on the 31st and in the Wabash proper on January 1st and 2d. The Tennessee and Cumberland Rivers showed rises with the Tennessee going just slightly above flood stage at Decatur, Ala., on the 27th.

At St. Louis, Mo., on the Mississippi River, a low stage of 3.2 feet below zero was recorded on the 17th which is the lowest free-water stage of record for the month of December at that station.

Table of flood stages during December 1936

[All dates in December unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE	*Feet*			*Feet*	
James: Columbia, Va	10	9	9	11.1	9
Tar: Greenville, N. C	13	17	21	13.7	20
Little: Kenly, N. C	8	14	19	12.2	18
Neuse:					
Neuse, N. C	14	11	13	15.9	12
Smithfield, N. C	13	12	20	18.4	14
Goldsboro, N. C	13	12	26	20.9	19
Kinston, N. C	14	16	28	17.9	22
Cape Fear: Lock No. 2, Elizabethtown, N. C	20	11	21	27.0	13
Peedee:					
Mars Bluff Bridge, S. C	17	18	24	18.6	21
Poston, S. C	18	24	25	18.0	24–25
Saluda:					
Pelzer, S. C	6	20	20	6.5	20
Chappells, S. C	15	20	21	16.4	21
Santee:		3	6	13.0	5
Rimini, S. C	12	9	14	12.8	11
		17	26	13.5	24
		31	(1)	12.2	31
		4	7	12.4	6, 7
Ferguson, S. C	12	10	15	12.5	13
		17	28	13.0	21–23, 26
Savannah:		9	12	16.3	10
Ellenton, S. C	14	18	27	20.5	23
Clyo, Ga	13	28	(1)	14.6	30

[1] Continued into January.

Table of flood stages during December 1936—Continued

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
EAST GULF OF MEXICO DRAINAGE	*Feet*			*Feet*	
Apalachicola: Blountstown, Fla	15	22	27	17.4	24
MISSISSIPPI SYSTEM					
Ohio Basin					
West Fork of White: Anderson, Ind	8	31	(1)	8.7	31
Wabash: La Fayette, Ind	11	31	Jan. 3	15.2	Jan. 1, 2
New: New River, Tenn	18	7	7	20.4	7
French Broad: Asheville, N. C	6	31	Jan. 1	[2] 6.2	31
Tennessee:					
Hales Bar Lock, Tenn. (Upper gage)	44	8	9	44.1	8
Decatur, Ala	20	24	28	20.8	27
Arkansas Basin					
Poteau: Poteau, Okla	21	28	28	21.6	28
Petit Jean: Danville, Ark	20	6	10	22.5	8
		29	29	20.1	29
Red Basin					
Sulphur:					
Ringo Crossing, Tex	20	6	10	23.6	7
		27	31	22.3	28
Naples, Tex	22	12	16	24.0	14

[2] Estimated.

WEATHER ON THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, I. R. TANNEHILL in charge]

NORTH ATLANTIC OCEAN, DECEMBER 1936

By H. C. HUNTER

Atmospheric pressure.—Pressure averaged lower than normal over the north-central and the far northeastern portions of the North Atlantic. The pressure around southern Greenland was, in general, low from the 14th onward, while over the Iceland-British Isles region it was low from the 11th to the 20th. Pressure averaged slightly lower than normal in the area of the Greater Antilles and southern Florida. Elsewhere over the Atlantic high pressure was the rule, notably in the vicinity of the Maritime Provinces and Newfoundland. From Nova Scotia to Bermuda abnormally high pressure prevailed from the 19th to the end of December.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, December 1936*

Station	Average pressure	Departure	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Julianehaab, Greenland	29.39	−0.09	30.28	4	28.70	19
Reykjavik, Iceland	29.36	−.11	30.28	6	28.23	20
Lerwick, Shetland Islands	29.53	−.19	30.33	26	28.32	14
Valencia, Ireland	30.01	+.07	30.68	23, 24	28.70	14
Lisbon, Portugal	30.30	+.19	30.56	6	30.00	11
Madeira	30.16	+.07	30.45	31	29.94	4, 26
Horta, Azores	30.26	+.12	30.56	8, 12	29.88	17
Belle Isle, Newfoundland	29.96	+.22	30.88	10	29.30	18
Halifax, Nova Scotia	30.23	+.28	30.88	9	29.52	21
Nantucket	30.22	+.17	30.71	3	29.46	20
Hatteras	30.21	+.08	30.66	23	29.63	17
Bermuda	30.20	+.08	30.48	31	29.92	14, 18
Turks Island	30.01	−.02	30.08	5	29.92	12
Key West	30.07	−.01	30.26	23	29.91	2
New Orleans	30.15	+.02	30.47	23	29.79	2

NOTE.—All data based on a. m. observations only, with departures compiled from best available normals related to time of observation, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour corrected means.

The extremes of pressure noted in the vessel reports at hand are [1] 30.86 and 28.44 inches. The higher reading was taken about 300 miles east of Cape Race on the American liner *Black Gull*, during the forenoon of the 10th; the lower was recorded on the American steamer *Scanstates*, at noon on the 19th, when near latitude 58° N., longitude 21° W. Readings slightly outside these limits were taken at certain of the shore stations whose figures appear in table 1, while a pressure of 28.11 is reported to have occurred at Thorshavn, Faroe Islands, on the 14th.

Cyclones and gales.—Fewer intense gales have been reported than for the average December, and the first 10 and final 10 days were less stormy, considering the whole North Atlantic, than the intervening period. Stormy conditions were, however, noted near the American coast from the 2d to 4th when a LOW that was centered in the Gulf of Mexico, near Tampa, during the forenoon of the 1st, with little strength, moved northeastward near the coast line reaching Newfoundland on the 4th with much increased energy. Some vessels met fresh to whole gales in connection with this storm, particularly on the 3d. (See chart IX.)

Almost all the gales of force greater than 9 were noted during the period from the 12th to 21st, and most of these were met to eastward of midocean. Stormy weather was persistent at this time near, and far to northward and westward of, the British Isles. Two vessels on the 14th encountered hurricane winds, the American S. S. *City of Joliet* when about 500 miles west-southwest of Valencia, Ireland, and the Belgian S. S. *Katanga* about 300 miles south-southeast of Valencia.

In waters near the American coast there were some reports of whole gales and many of fresh to strong gales

[1] The international radio exchange (Rugby bulletin) of Dec. 8 contains an observation from a ship (name not given) in 44.5° N., 18.2° W., at 0600 g. m. t. of that date, with a pressure of 1,046 millibars (30.89 inches).